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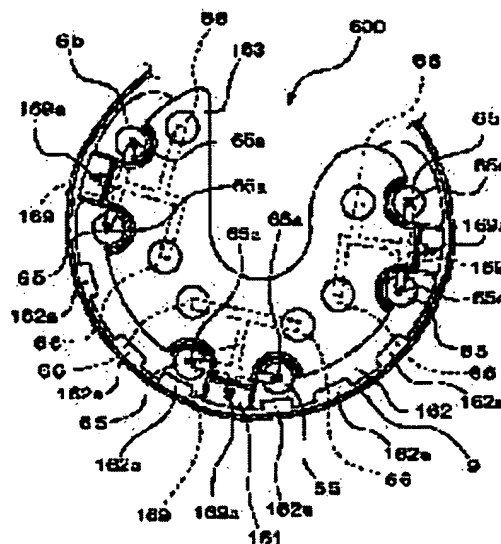
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(54) VEHICLE AC GENERATOR

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a vehicle AC generator in which a drain for muddy water, etc., is secured, regardless of the deformation of a cover.

SOLUTION: A vehicle AC generator has a rectifier attached to the outside of a frame on the rear side in the axial direction and a rear cover 9, which covers various electrical components including the rectifier. Cut parts 162a are formed in the outer circumference of the negative electrode side cooling plate 162 of the rectifier, and predetermined gaps are formed between the outer circumference of the radiation plate and the inner circumference of the rear cover 9 formed into a substantially circular shape. Muddy water, etc., penetrating with cooling air through the suction hole of the rear cover 9 will not stay inside the rear cover 9 but is, discharged drained through the cut parts 162a.



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CLAIMS

[Claim(s)]

[Claim 1] Said rectifier is an AC generator for cars characterized by having the heat sink in which the rectifying device was attached in the AC generator for cars equipped with wrap covering in the rectifier which rectifies the alternating voltage which carried out induction to the stator winding, and said rectifier, and forming a crevice in the periphery section of said heat sink by rotating a rotator.

[Claim 2] It is the AC generator for cars characterized by being arranged at the both sides of the electrical connection where said crevice connects said stator winding and said rectifying device electrically in claim 1.

[Claim 3] It is the AC generator for cars characterized by forming said heat sink in the radii configuration in claim 2, making said electrical connection of an arc mostly located in the center correspond, and forming said crevice.

[Claim 4] The periphery on either of claims 1-3 and corresponding to said heat sink in said covering is the AC generator for cars characterized by having a circular configuration mostly.

[Claim 5] It is the AC generator for cars characterized by being carried in the outside of a frame in which said rectifier holds said rotator and stator in either of claims 1-4, and for said frame having the loading side formed almost in parallel with said heat sink, and making the depth of the direction of a path of said crevice mostly in agreement with the direction radial border of a path of said loading side.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the AC generator for cars carried in a passenger car, a truck, etc.

[0002]

[Description of the Prior Art] In the common AC generator for cars, since the induced voltage of the alternating current generated in the stator winding around which the stator core is looped is rectified when rotating a rotator, the rectifier is built in. For example, when also taking out the neutral point output which connected each two phases of six pieces or a three phase coil at a time in total to each phase when a stator winding consisted of a three phase, the rectifier containing eight rectifying devices is equipped, and three phase full wave rectification is performed by this rectifier. Electrical parts, such as such a rectifier and voltage adjustment equipment, are protected by wrap covering in the whole, as shown in drawing 4.

[0003] Many inhalation apertures of the cooling style are formed in this covering, and the electrical part of the various kinds therefore mentioned above and cooling of the stator winding incorporated inside through this inhalation aperture are performed in the style of cooling. Moreover, two or more swelling parts 100 are formed in covering at the periphery section, and muddy water, the electrolytic solution, etc. which both permeate as the style of cooling are discharged from this swelling part 100.

[0004]

[Problem(s) to be Solved by the Invention] By the way, in the conventional AC generator for cars mentioned above, in case it attaches in an engine room, or when foreign matters, such as a pebble, hit during transit, the swelling part 100 of covering deforms and there is a possibility that the path which discharges muddy water etc. may be taken up.

[0005] This invention is created in view of such a point, and the purpose is in offering the AC generator for cars which can secure the path which discharges muddy water etc. irrespective of the existence of deformation of covering.

[0006]

[Means for Solving the Problem] According to invention of claim 1, by rotating a rotator, it has the heat sink in which, as for said rectifier, the rectifying device was attached in the AC generator for cars equipped with wrap covering in the rectifier which rectifies the alternating voltage which carried out induction to the stator winding, and said rectifier, and is characterized by forming a crevice in the periphery section of said heat sink. Even if it is the case where covering deforms partially, since this crevice and the medial surface of covering hardly become the completely same configuration, it becomes possible to discharge certainly the muddy water which permeated into covering, the electrolytic solution, etc. from this crevice.

[0007] According to invention of claim 2, in the AC generator for cars of claim 1, said crevice is characterized by being arranged at the both sides of the electrical connection which connects said stator winding and said rectifying device electrically. Since a crevice is arranged at the both sides of an

electrical connection, muddy water etc. cannot pile up near an electrical connection, and can prevent generating of poor insulation's etc. fault.

[0008] According to invention of claim 3, in the AC generator for cars of claim 2, said heat sink is characterized by being formed in the radii configuration, making said electrical connection of an arc mostly located in the center correspond, and forming said crevice. Since considering the arrangement condition of brush equipment of passing an exciting current to a rotator the electrical connection of the heat sink of a radii configuration mostly located in the center turns down (the direction of the ground) when it attaches the AC generator for cars in a car , when forming the crevice which this electrical connection was made to correspond and was mentioned above , the effectiveness of preventing generating of faults , such as poor insulation's generating , becomes the largest .

[0009] According to invention of claim 4, in one AC generator for cars of claims 1-3, said covering is characterized by the periphery corresponding to said heat sink having a circular configuration mostly. Since paths for wastewater, such as muddy water, are secured by forming a crevice in a heat sink, it becomes possible to make the periphery configuration of corresponding covering into a simple circular configuration. Therefore, since a die service life becomes long while a die design becomes easy, reduction of a manufacturing cost is attained.

[0010] According to invention of claim 5, in one AC generator for cars of claims 1-4, it is carried in the outside of a frame in which said rotator and stator are held, said frame has the loading side formed almost in parallel with said heat sink, and said rectifier is characterized by making the depth of the direction of a path of said crevice mostly in agreement with the direction radial border of a path of said loading side. Since the muddy water discharged through a crevice can prevent interfering in a frame, the muddy water which infiltrated into the interior of covering can be discharged outside certainly.

[0011]

[Embodiment of the Invention] Hereafter, the AC generator for cars of 1 operation gestalt which applied this invention is explained to a detail, referring to a drawing.

[0012] Drawing 1 is drawing showing the whole AC-generator configuration for cars. Moreover, drawing 2 is drawing which looked at the rectifier of the AC generator for cars shown in drawing 1 from the rear-side. AC generator 1 for cars of this operation gestalt is constituted including a stator 2, a rotator 3, frames 4 and 5, a rectifier 6, brush equipment 7, the voltage regulator 8, and the rear cover 9 grade.

[0013] The stator 2 is equipped with the insulator 24 which carries out electric insulation of between a stator core 22, the stator winding 23 of a three phase, and stator cores 22 and stator windings 23.

[0014] The rotator 3 has cylindrical and the structure between which each put the field winding 31 coiled about in the shape of a said alignment from both sides through the revolving shaft 33 by the field core 32 which has six claw parts for the copper wire by which insulating processing was carried out. Moreover, the cooling fan 35 for breathing out the cooling wind absorbed from the front-side in shaft orientations and the direction of a path is attached in the end face of the field core 32 of a front-side by welding etc. Similarly, the cooling fan 36 for breathing out the cooling wind absorbed from the rear-side in the direction of a path is attached in the end face of the field core 32 of a rear-side by welding etc. Moreover, near the rear-side edge of a revolving shaft 33, the two slip rings 37 and 38 connected electrically are formed in the both ends of a field winding 31, and electric supply is performed from brush equipment 7 to a field winding 31 through these slip rings 37 and 38.

[0015] While frames 4 and 5 have held the stator 2 and the rotator 3 and the rotator 3 is supported in the pivotable condition centering on the revolving shaft 33, the stator 2 arranged through a predetermined clearance at the periphery side of the field core 32 of a rotator 3 is being fixed. These frames 4 and 5 have the regurgitation apertures 41 and 51 of the cooling style into the part which countered the stator winding 23 projected from the shaft-orientations end face of a stator core 22, and have the inhalation apertures 42 and 52 in the shaft-orientations end face.

[0016] A rectifier 6 is for rectifying the three-phase-alternating-current electrical potential difference generated by the stator winding 23 of a three phase, and acquiring a direct current. Moreover, the rear cover 9 as a protection member is attached so that the rectifier 6 attached in the outside of a frame 5, brush equipment 7, and a voltage regulator 8 may be covered, and it protects these from a foreign

matter. A rear cover 9 is manufactured by carrying out press forming of the metal plate, and has two or more inhalation hole 9a which incorporates a cooling wind from a shaft-orientations outside.

[0017] If the turning effort from an engine (not shown) is told to a pulley 20 through a belt etc., a rotator 3 will rotate AC generator 1 for cars which has the structure mentioned above in the predetermined direction. By impressing energizing voltage to the field winding 31 of a rotator 3 from the exterior in this condition, each claw part of a field core 32 is excited, a stator winding 23 can be made to generate a three-phase-alternating-current electrical potential difference, and predetermined direct current power is taken out from the output terminal of a rectifier circuit 6. Moreover, since the cooling fan 35 of a front-side rotated when a rotator 3 rotates, while the cooling wind was incorporated from the inhalation aperture 42 formed in the shaft-orientations end face of the frame 4 of a front-side and the part was led to the coil end of the front-side of a stator winding 23, after the remainder is led to field-winding 31 front face through between the pawls of the field core 32 of a rotator 3, it is discharged from the regurgitation apertures 41 and 51. Similarly, since the cooling fan 36 of a rear-side rotates, after the cooling wind incorporated from inhalation-of-air hole 9a formed in the rear cover 9 is led to a frame 4 and the 5 interior through the inhalation-of-air aperture 52 formed in the shaft-orientations end face of the frame 5 of a rear-side after cooling the various electrical parts of rectifier 6 grade and is led to the coil end of the rear-side of a stator winding 23 after that, it is discharged from the regurgitation aperture 51.

[0018] Next, the detail configuration of a rectifier 6 is explained. As shown in drawing 2, the rectifier 6 is constituted including the negative-electrode side heat sink 162 in which the six negative-electrodes side rectifying device 65 was attached, the positive-electrode side heat sink 163 in which the six positive-electrodes side rectifying device 66 was attached, and the terminal block 161 which wires by making the two negative-electrodes side rectifying device 65 and the two positive-electrodes side rectifying device 66 into 1 set.

[0019] Although the negative-electrode side rectifying device 65 is attached in six places which met the circumferencial direction at the predetermined spacing by junction by soldering, joining, etc. at the negative-electrode side heat sink 162, it is not distributing equally, and two pieces incline at a time and the junction location is arranged. Although similarly the positive-electrode side rectifying device 66 is attached in six places which met the circumferencial direction at the predetermined spacing by junction by soldering, joining, etc. at the positive-electrode side heat sink 163, the junction location is not equal, inclines toward the location close to every two negative-electrode side rectifying devices 65 inclined and arranged in the negative-electrode side heat sink 162 mentioned above, and is arranged in it.

[0020] Thus, as for the negative-electrode side rectifying device 65 contained in a rectifier 6, and the positive-electrode side rectifying device 66, each makes four of the sum total 1 set two pieces at a time, and 3 sets is prepared on the whole. The two negative-electrodes side rectifying device 65 contained in each group and the two positive-electrodes side rectifying device 66 are joined to each of two or more electrodes 169 for wiring prepared in the terminal block 161. Moreover, this electrode 169 for wiring is connected to each of three leader lines pulled out from the stator winding 23. For example, in the rectifier 6 shown in drawing 2, each leader line pulled out from the stator winding 23 is joined to the electrode 169 for wiring by soldering, joining, etc. The electrical connection which connects electrically a stator winding 23 and rectifying devices 65 and 66 is formed of joint 65a of the negative-electrode side rectifying-device 65 grade and the electrode 169 for wiring which were mentioned above, and joint 169a of the leader line of a stator winding 23, and the electrode 169 for wiring.

[0021] Moreover, the negative-electrode side heat sink 162 of the side near a frame 5 is formed in the radii configuration except the circular ring cutting section 600, and notch 162a of plurality (for example, six pieces) is formed within the limits of 180 degrees of the direction opposite side of a path, in view of this circular ring cutting section 600. the arc corresponding to [this notch 162a is formed only in the edge of the direction outside of a path of the negative-electrode side heat sink 162 of a radii configuration, and] the periphery of the negative-electrode side heat sink 162 in that formation location -- it is mostly unevenly distributed in the center. If it puts in another way, it is unevenly distributed in the both sides of the electrical connection (joints 65a and 169a) of the arc corresponding to the periphery

of the negative-electrode side heat sink 162 mostly located in the center. When brush equipment 7 has been arranged in the circular ring cutting section 600, the formation location of notch 162a is set up in this way, because the thing of the arc which is the opposite side which near a center turns down (the direction of the ground) on the occasion of the actual installation to a car was mostly taken into consideration.

[0022] Moreover, since notch 162a was formed, the periphery edge of the negative-electrode side heat sink 162 has become tooth-like. The heights in the shape of this tooth-like are making the circular edge with a predetermined radius, and the crevice is making the long rectangle which touched the circle which has a predetermined radius. And notch 162a which this crevice mentioned above is formed.

[0023] Moreover, as shown in drawing 2, the periphery configuration of a rear cover 9 is formed almost circularly [the part corresponding to the negative-electrode side heat sink 162], and a big swelling part like before does not exist. For this reason, on the occasion of attachment etc., it does not deform in other components etc., or during car transit, a pebble etc. hits and this swelling part does not deform.

[0024] Drawing 3 is a partial expanded sectional view near a rectifier. As shown in this drawing, the negative-electrode side heat sink 162 and the positive-electrode side heat sink 163 are arranged on both sides of the terminal block 161 in two steps at shaft orientations. After the cooling wind incorporated from inhalation hole 9a of a rear cover 9 hits the positive-electrode side heat sink 163, it is led to a stator winding 23 side through the inhalation aperture 52 by which the part flowed on the direction outside of a path, arrived at the front face of the negative-electrode side heat sink 162, and was formed after that in the shaft-orientations end face of a frame 5.

[0025] Moreover, since notch 162a is formed in the periphery edge of the negative-electrode side heat sink 162 of this operation gestalt as mentioned above, the path divided by the negative-electrode side heat sink 162 and the rear cover 9 of that outside in this part is formed. As shown in drawing 3, in notch 162a, only depth L has become depressed, and the periphery edge of this depth direction is made mostly in agreement with the direction radial border of a path of the loading side 54 of the negative-electrode side heat sink 162 formed in a frame 5 on the periphery edge of the negative-electrode side heat sink 162.

[0026] The loading side 54 formed in the frame 5 and the negative-electrode side heat sink 162 are arranged almost in parallel through the predetermined clearance, and the ventilation flue is formed of this clearance. Moreover, the clearance is formed between opening edge 9b of a rear cover 9, and a frame 5, and the cooling wind incorporated to the rear cover 9 interior through this clearance is led to the inhalation aperture 52 side of a frame 5 through the ventilation flue formed between the loading side 54 and the negative-electrode side heat sink 162.

[0027] Thus, in AC generator 1 for cars of this operation gestalt, the muddy water which permeated into [both] the rear cover 9 as the style of cooling can be discharged outside through notch 162a formed in the periphery edge of the negative-electrode side heat sink 162. Discharge can be ensured without checking discharge of the muddy water from notch 162a etc., since the depth of this notch 162a is made mostly in agreement with the direction radial border of a path of the loading side 54 of a frame 5 especially.

[0028] Moreover, cooling nature is securable even if the area of the negative-electrode side heat sink 162 decreases by preparing notch 162a, since the number of cooling is drawn in a cooling fan 36 through the ventilation flue of the direction of a path formed between the negative-electrode side heat sink 162 and the loading side 54. And since there is no stagnation of foreign matters, such as muddy water, near the inlet port of the ventilation flue of the direction of a path mentioned above cannot be taken up, and the fall of cooling nature can be prevented. Moreover, since rectification of each phase of a stator winding 23 is performed by the positive-electrode side [two pairs] rectifying device 66 and the negative-electrode side rectifying device 65, respectively, generation of heat is distributed, and it can prevent that a rectifier 6 becomes an elevated temperature locally.

[0029] By the above, without forming the partial swelling of the outer-diameter direction of a rear cover 9, it excels in a resistance to environment and AC generator 1 for cars which does not produce the bad influence to the cooling nature of a rectifier 6, either can be realized.

[0030] Invention is not limited to the above-mentioned operation gestalt, and deformation implementation various by within the limits of the summary of this invention is possible for it. For example, although the metal rear cover 9 was used, you may make it manufacture with the operation gestalt mentioned above using a nonmetal material, for example, a heat-resistant resin ingredient. Thereby, the poor insulation between a rear cover 9 and a rectifier 8 can be prevented certainly.

[0031] Moreover, although parallel connection of the two rectifying devices is carried out and the rectifier 6 is constituted from an operation gestalt mentioned above, you may make it use a rectifying device independently. In this case, since a rectifier can be constituted using a total of six rectifying devices, spacing between adjoining rectifying devices can be opened and the degree of freedom to which only that part designs the magnitude and the location of notch 162a will increase. Therefore, it becomes possible to correspond to two or more use gestalten from which an installation location differs.

[0032] Moreover, although notch 162a as a crevice was formed in the periphery edge of the negative-electrode side heat sink 162 with the operation gestalt mentioned above, if a view is changed, heights are formed in the periphery edge of the negative-electrode side heat sink 162 of a minor diameter, the crevice which is equivalent to a notch between heights as a result may be made to be formed, and it cannot be overemphasized that the deformation on such appearance also includes this invention.

[0033] Moreover, with the operation gestalt mentioned above, as shown in drawing 2 , the clearance was formed between the periphery edge except notch 162a of the negative-electrode side heat sink 162 of a rectifier 6, and the inner skin of a rear cover 9, but you may make it contact these so that this clearance may not be formed.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is drawing showing the whole AC-generator configuration for cars of 1 operation gestalt.

[Drawing 2] Drawing 2 is drawing which looked at the rectifier of the AC generator for cars shown in drawing 1 from the rear-side.

[Drawing 3] It is a partial expanded sectional view near [which is shown in drawing 1] a rectifier.

[Drawing 4] It is the top view of the conventional AC generator for cars.

[Description of Notations]

1 AC Generator for Cars

2 Stator

3 Rotator

4 Five Frame

6 Rectifier

9 Rear Cover

65 Negative-Electrode Side Rectifying Device

66 Positive-Electrode Side Rectifying Device

162 Negative-Electrode Side Heat Sink

162a Notch

163 Positive-Electrode Side Heat Sink

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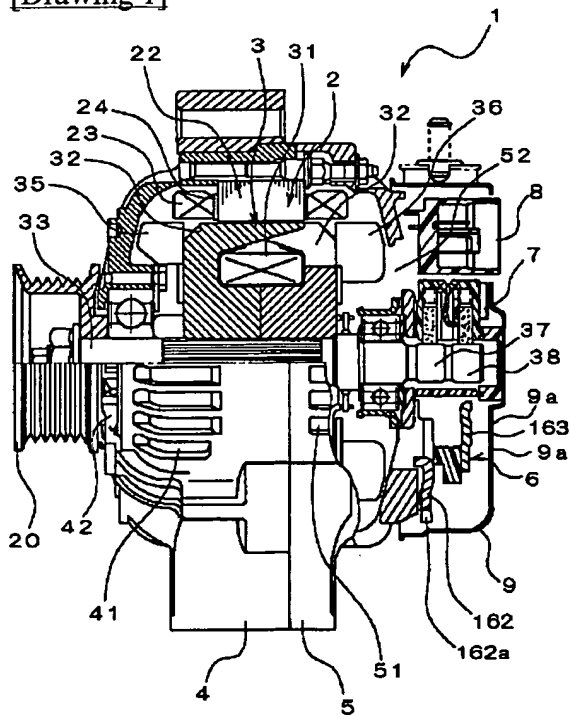
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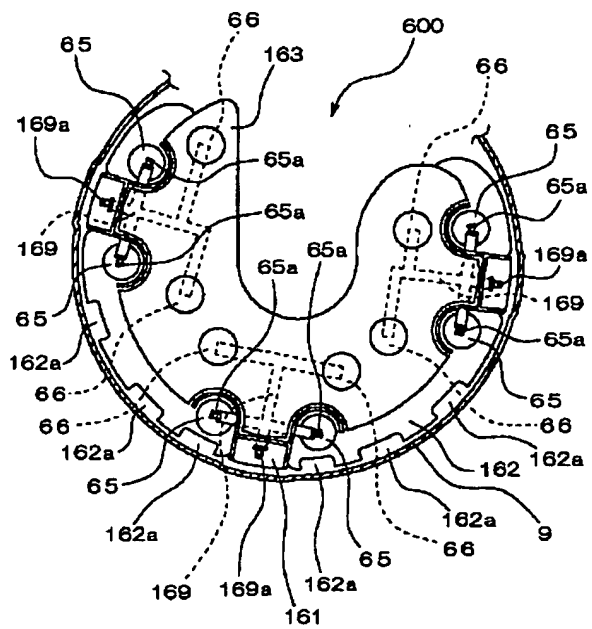
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DRAWINGS

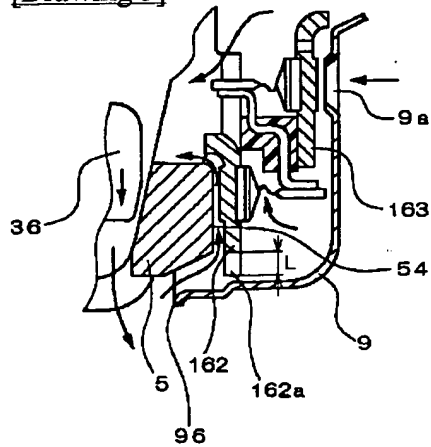
[Drawing 1]



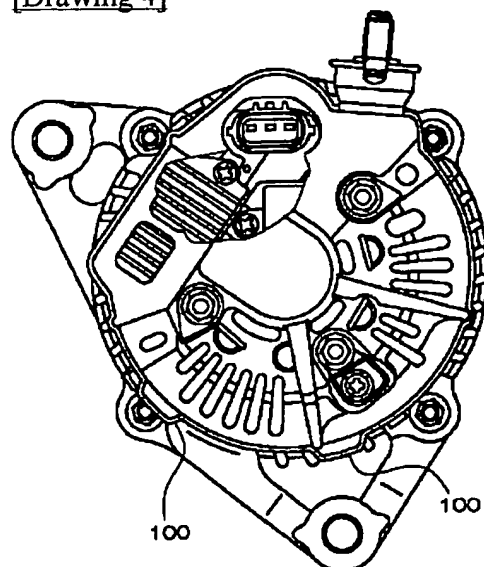
[Drawing 2]



[Drawing 3]



[Drawing 4]



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APPENDIX

Japanese Patent JP 2001-037142 discloses heat sink plates (162, 163) forming a two-story structure (Fig. 3).